



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

7590 03/19/2008

Timothy E Nauman Esq
Fay Sharpe Fagan Minnich & McKee LLP
7th Floor
1100 Superior Avenue
Cleveland, OH 44114-2516

EXAMINER

GUADALUPE, YARITZA

ART UNIT

PAPER NUMBER

2859

DATE MAILED: 03/19/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/648,140

08/25/2000

Jerry Schlagheck

CLW-2-0132

5345

TITLE OF INVENTION: DETECTION OF DEFECTS BY THERMOGRAPHIC ANALYSIS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1440	\$0	\$0	\$1440	06/19/2008

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

7590 03/19/2008

Timothy E Nauman Esq
Fay Sharpe Fagan Minnich & McKee LLP
7th Floor
1100 Superior Avenue
Cleveland, OH 44114-2516

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/648,140	08/25/2000	Jerry Schlagheck	CLW-2-0132	5345

TITLE OF INVENTION: DETECTION OF DEFECTS BY THERMOGRAPHIC ANALYSIS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1440	\$0	\$0	\$1440	06/19/2008

EXAMINER	ART UNIT	CLASS-SUBCLASS
GUADALUPE, YARITZA	2859	374-005000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/648,140	08/25/2000	Jerry Schlagheck	CLW-2-0132	5345

7590 03/19/2008

Timothy E Nauman Esq
Fay Sharpe Fagan Minnich & McKee LLP
7th Floor
1100 Superior Avenue
Cleveland, OH 44114-2516

EXAMINER

GUADALUPE, YARITZA

ART UNIT

PAPER NUMBER

2859

DATE MAILED: 03/19/2008

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 46 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 46 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability

Application No.

09/648,140

Applicant(s)

SCHLAGHECK ET AL.

Examiner

YARITZA GUADALUPE-MCCALL

Art Unit

2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE filed September 15, 2004.
2. ☒ The allowed claim(s) is/are 2-7.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

/YARITZA GUADALUPE-MCCALL/
Primary Examiner, Art Unit 2859

DETAILED ACTION

In response to Request for Continued Examination filed September 15, 2004

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.
2. The Application has been Amended as follows ;
 - a. Claims 1 has been cancelled.
 - b. Claim 2 : Please replace the claim language with the following text:

“A method for detecting a defect in a populated circuit board, said populated circuit board having a first side and an opposite second side, at least said first side being populated with one or more surface mounted components: said method comprising :

1) directing a thermal wave at the second side of said populated circuit board

2) recording a thermographic image of the first side of said populated circuit board once a surface thereof reaches a predetermined transit temperature or a predetermined transit time period has elapsed; and

3) analyzing the obtained thermographic image by comparing the so obtained thermographic image with a standard thermographic image wherein

a) the thermal wave is developed by a thermal heater array comprising a plurality of discrete individually controllable heat source elements, said elements each delivering a respective individual energy intensity reflecting the respective energy parameter information therefor comprised in a first block of energy parameter information;

b) said first block of energy parameter information comprising, for each of said heat source elements, individual energy parameter information whereby the thermal heater - . array may be induced to provide a thermal wave giving rise to a thermographic image indicative of uniform temperature of the surface of the first side of an predetermined unpopulated circuit board; and

c) said standard thermographic image having been obtained by i) subjecting the second side of a predetermined populated circuit board to a thermal wave developed by said thermal heater array, said thermal field being applied until a surface of the first side o f the predetermined populated circuit board reaches said predetermined transit temperature or said predetermined transit time period has elapsed, said elements of said thermal heater array each being set to deliver a respective individual energy intensity reflecting the energy parameter

information of said first block of energy parameter information, and ii) taking said standard thermographic image from the first side of said predetermined populated circuit board once said predetermined transit temperature is reached or said predetermined transit time period has elapsed.”

c. Claim 3 : Please replace the claim language with the following text:

“A method for detecting a defect in a populated circuit board, said populated circuit board having a first side and a second opposite side, at least said first side being populated with one or more surface mounted components, said method comprising :

- 1) directing a thermal wave at the second side of the populated circuit board
- 2) recording a thermographic image of the first side of the populated circuit board once a predetermined transit temperature is reached on this side of the populated circuit board or a predetermined transit time period has elapsed; and
- 3) analyzing the obtained thermographic image by comparing the so obtained thermographic image with a standard thermographic image wherein the standard thermographic image has been obtained by

- a) monitoring the temperature of a surface of the first side of an predetermined unpopulated circuit board

- b) subjecting the second side of the unpopulated circuit board to a thermal wave developed by a thermal heater array comprising a plurality of discrete individually controllable heat source elements, said elements each being initially

set to deliver an. individual energy intensity such that the thermal array delivers a thermal wave of predetermined contour;

c) adjusting the individual energy intensity of each of said elements until the thermal array delivers a thermal wave such that the surface being monitored provides a thermographic image thereof indicative of uniform temperature

d) storing a first block of energy parameter information corresponding to the individual energy intensity of each of said heat source elements found to provide the recorded thermographic image indicative of uniform temperature

e) monitoring the temperature of the first side of a predetermined populated circuit board

f) subjecting the second side of the predetermined populated circuit board to a thermal wave developed by a thermal heater array comprising a plurality of discrete individually controllable heat source elements, said elements each being set to deliver a respective individual energy intensity reflecting the energy parameter information of said first block of energy parameter information, said thermal wave being applied until a surface site of the first side of the predetermined populated circuit board reaches said predetermined transit temperature or said predetermined transit time period has elapsed and taking a second thermographic image; and, if desired,

g) storing a block of image information corresponding to the second thermographic image, said second thermographic image being Said standard thermographic image.”

d. Claim 4 : Please replace the claim language with the following text:

“A method for detecting a defect in a populated sample having a thickness dimension substantially smaller than the length and width dimensions thereof, said populated sample having a first side and an opposite second side, at least said first side of said populated sample having one or more surface mounted components, said method comprising :

1) directing a thermal wave at said second side of said populated sample
2) recording a thermographic image of the first Side of said populated sample once a surface thereof reaches a predetermined transit temperature or a predetermined transit time period has elapsed; and

3) analyzing the obtained thermographic image by comparing the so obtained thermographic image with a standard thermographic image wherein

a) the thermal wave is developed by a thermal heater array comprising a plurality of discrete individually controllable heat source elements, said elements each delivering a respective individual energy intensity reflecting the respective energy parameter information therefor comprised in a first block of energy parameter information;

b) said first block of energy parameter information comprising, for each of said heat source elements, individual energy parameter information whereby the thermal heater array may be induced to provide a thermal wave giving rise to a thermographic image indicative of uniform temperature of the surface of the first side of an unpopulated sample; and

c) said standard thermographic image having been obtained by i) subjecting the second side of a predetermined populated sample to a thermal wave developed by said thermal heater array, said thermal field being applied until a surface of the first side of the predetermined populated sample reaches said predetermined transit temperature or said predetermined transit time period has elapsed, said elements of said thermal heater array each being set to deliver a respective individual energy intensity reflecting the energy parameter information of said first block of energy parameter information, and ii) taking said standard thermographic image from the 3 first side of the predetermined populated sample once said predetermined temperature is reached or said predetermined transit time has elapsed.”

e. Claim 5 : Please replace the claim language with the following text:

“A method for detecting a defect in a populated sample having a thickness dimension substantially smaller than the length and width dimensions thereof, said sample having a first side and a second opposite side, at least said first side of said populated sample having one or more surface mounted components, said method comprising:

- 1) directing a thermal wave at the second side of said populated sample
- 2) recording a thermographic image of the first side of said populated sample once a predetermined transit temperature is reached on this side of the populated sample or a predetermined transit time period has elapsed; and

3) analyzing the obtained thermographic image by comparing the so obtained thermographic image with a standard thermographic image, wherein the standard thermographic image has been obtained by

a) monitoring the temperature of a surface of the first side of an predetermined unpopulated sample

b) subjecting the second side of the unpopulated sample to a thermal wave developed by a thermal heater array comprising a plurality of discrete individually controllable heat source elements, said elements each being initially set to deliver an individual energy intensity such that the thermal array delivers a thermal wave of predetermined contour;

c) adjusting the individual energy intensity of each of said elements until the thermal array delivers a thermal wave such that the surface being monitored provides a thermographic image thereof indicative of uniform temperature

d) storing a first block of energy parameter information corresponding to the individual energy intensity of each of said heat source elements found to provide the recorded thermographic image indicative of uniform temperature

e) monitoring the temperature of the first side of a predetermined populated sample

f) subjecting the second side of the predetermined populated sample to a thermal wave developed by a thermal heater array comprising a plurality of discrete individually controllable heat source elements, said elements each being set to deliver a respective individual energy intensity reflecting the energy parameter information of said first block

of energy parameter information, said thermal wave being applied until a surface site reaches a predetermined transit temperature or a predetermined transit time period has elapsed and taking a second thermographic image; and, if desired,

g) storing a block of image information corresponding to the second thermographic image, said second thermographic image being said standard thermographic image.”

f. Claim 6 : Please replace the claim language with the following text:

“A method for obtaining a standard thermographic image for use in detecting a defect in a populated circuit board, said populated circuit board having a first side and a second opposite side, at least said first side being populated with one or more surface mounted components, said method comprising:

a) monitoring the temperature of a surface of the first side of an predetermined unpopulated circuit board

b) subjecting the second side of the unpopulated circuit board to a thermal wave developed by a thermal heater array comprising a plurality of discrete individually controllable heat source elements, said elements each being initially set to deliver an individual energy intensity such that the thermal array delivers a thermal wave of predetermined contour:,

c) adjusting the individual energy intensity of each of said elements until the thermal array delivers a thermal wave such that the surface being monitored provides a thermographic image thereof indicative of uniform temperature

- d) storing a first block of energy parameter information corresponding to the individual energy intensity of each of said heat source elements found to provide the recorded thermographic image indicative of uniform temperature
- e) monitoring the temperature of the first side of a predetermined populated circuit board
- f) subjecting the second side of the predetermined populated circuit board to a thermal wave developed by a thermal heater array comprising a plurality of discrete individually controllable heat source elements, said elements each being set to deliver a respective individual energy intensity reflecting the energy parameter information of said first block of energy parameter information, said thermal wave being applied until a surface site of the first side of the predetermined populated circuit board reaches said predetermined transit temperature or said predetermined transit time period has elapsed and taking a second thermographic image; and, if desired,
- g) storing a block of image information corresponding to the second thermographic image, said second thermographic image being said standard thermographic image.”

g. Claim 7 : Please replace the claim language with the following text:

“A method for obtaining a standard thermographic image for detecting a defect in a populated sample having a thickness dimension substantially smaller than the length and width dimensions thereof, said sample having a first side and a second opposite side, at least said first side of said populated sample having one or more surface mounted components, said method comprising

- a) monitoring the temperature of a surface of the first side of an predetermined unpopulated sample
- b) subjecting the second side of the unpopulated sample to a thermal wave developed by a thermal heater array comprising a plurality of discrete individually controllable heat source elements, said elements each being initially set to deliver an individual energy intensity such that the thermal array delivers a thermal wave of predetermined contour;
- c) adjusting the individual energy intensity of each of said elements until the thermal array delivers a thermal wave such that the surface being monitored provides a thermographic image thereof indicative of uniform temperature
- d) storing a first block of energy parameter information corresponding to the individual energy intensity of each of said heat source elements found to provide the recorded thermographic image indicative of uniform temperature
- e) monitoring the transit temperature of the first side of a predetermined populated sample
- f) subjecting the second side of the predetermined populated sample to a thermal wave developed by a thermal heater array comprising a plurality of discrete individually controllable heat source elements, said elements each being set to deliver a respective individual energy intensity reflecting the energy parameter information of said first block of energy parameter information, said thermal wave being applied until a surface site reaches a predetermined transit temperature or a predetermined transit time period has elapsed and taking a second thermographic image; and, if desired,

g) storing a block of image information corresponding to the second thermographic image, said second thermographic image being said standard thermographic image.”

Reasons for Allowance

2. Claims 2 and 4 are allowable over the Prior Art of Record because it fails to teach or suggest a method for detecting a defect in a populated circuit board comprising the step of analyzing the obtained thermographic image by comparing with a standard thermographic image, wherein the standard thermographic image has been obtained by i.) subjecting the second side of the populated circuit board to a thermal wave from the heater array, applying said thermal field until the surface of the populated circuit board reaches a predetermined transit temperature or said transit time period has elapsed, and ii.) taking said standard thermographic image once the said predetermined transit temperature is reached or said predetermined transit time period has elapsed in combination with the remaining limitations of the claims.

3. Claims 3 and 5 are allowable over the Prior Art of Record because it fails to teach or suggest a method for detecting a defect in a populated circuit board comprising the step of analyzing the obtained thermographic image by comparing with a standard thermographic image, wherein the standard thermographic image has been obtained by i.) monitoring the temperature of a surface of the populated circuit board, ii.) subjecting the second side of the populated circuit board to a thermal wave from the heater array, iii.) storing a first block of energy parameter information corresponding to the individual energy intensity of each heat source element,

applying said thermal field until the surface of the populated circuit board reaches a predetermined transit temperature or said transit time period has elapsed, and taking and storing a block of image information corresponding to said standard thermographic image in combination with the remaining limitations of the claims.

4. Claims 6 and 7 are allowable over the Prior Art of Record because it fails to teach or suggest a method for detecting a defect in a populated circuit board comprising the step of storing a first block of energy parameter information corresponding to the individual energy intensity of each heat source element, subjecting the second side of the populated circuit board to a thermal wave from the heater array comprising a plurality of individually controllable heat source elements, applying said thermal field until the surface of the populated circuit board reaches a predetermined transit temperature or said transit time period has elapsed, and ii.) storing a block of image information corresponding to the second thermographic image, said second thermographic image being the standard thermographic image in combination with the remaining limitations of the claim.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yaritza Guadalupe-McCall whose telephone number is (571)272-2244. The examiner can normally be reached on 8:00 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean Reichard can be reached on (571) 272-1984. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

YGM
March 4, 2008

/YARITZA GUADALUPE-MCCALL/
Primary Examiner, Art Unit 2859